

Claims

1. A method for creating a scaled halftoned destination pixel image from a source pixel image portion that comprises plural source pixels; said method comprising the steps of:

a) creating a scaled set of matrix values;

10 b) depending upon a determined halftone relationship of a source pixel and each of said scaled set of matrix values, creating a scaled set of destination pixels, each respective destination pixel value dependent upon a relationship of a value of said source pixel and a corresponding matrix value; and

15 c) repeating step b) for each source pixel, using said scaled set of matrix values, and arranging said scaled set of matrix values to create a determined halftone pattern over said source pixels that exhibits a desired repeating pattern, each said scaled set of destination pixels produced thereby exhibiting a reduced tonal error as a result of use of said scaled set of matrix values for each said source pixel.

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2. The method as recited in claim 1, wherein said determined halftone pattern exhibits a repetition frequency that is less than a repetition frequency of said source pixels.

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3. The method as recited in claim 1, wherein said scaled set of matrix values encompasses plural source pixels, and said scaled set of matrix values is arranged so as to allocate sets of destination matrix values among adjoining source pixels to create a destination pixel arrangement that exhibits a dispersion of error values.

4. The method as recited in claim 1, wherein said rearranging of said scaled set of matrix values is performed in accord with the following steps:

assigning an origin position to each said source pixel in accord with a desired halftone pattern; and

arranging said scaled set of matrix values about said origin position so as to create a consistent and repeating pattern of said set of destination pixels about said origin position.

5. The method as recited in claim 4, wherein said rearranging for each set of destination pixels is performed by assigning destination pixel values in accord with destination pixel priority values, each priority value determined by a distance relationship to a respective origin position.

6. A memory media for controlling a processor to create a scaled halftoned destination pixel image from a source pixel image portion that comprises plural source pixels, said memory media comprising:

a) means for controlling said processor to create a scaled set of matrix values;

5 b) means for controlling said processor to create a scaled set of destination pixels, depending upon a determined halftone relationship of a source pixel and each of said scaled set of matrix values, each
10 respective destination pixel value dependent upon a relationship of a value of said source pixel and a corresponding matrix value; and

 c) means for controlling said processor to cause means b) to repeat its respective operation for each
15 source pixel, using said scaled set of matrix values, and for each source pixel, to arrange said scaled set of matrix values to create a determined halftone pattern over said source pixels that exhibits a desired repeating pattern, each said scaled set of destination
20 pixels produced thereby exhibiting a reduced tonal error as a result of use of said scaled set of matrix values for each said source pixel.

7. The memory media as recited in claim 6,
25 wherein said determined halftone pattern exhibits a repetition frequency that is less than a repetition frequency of said source pixels.

8. The memory media as recited in claim 6,
30 wherein said scaled set of matrix values encompasses plural source pixels, and said scaled set of matrix values is arranged so as to allocate sets of

destination matrix values among adjoining source pixels to create a destination pixel arrangement that exhibits a dispersion of error values.

5 9. The memory media as recited in claim 6, wherein means c) controls said processor to rearrange said scaled set of matrix values in accord with the following steps:

10 assigning an origin position to each said source pixel in accord with a desired halftone pattern; and

 arranging said scaled set of matrix values about said origin position so as to create a consistent and
15 repeating pattern of said set of destination pixels about said origin position.

 10. The memory media as recited in claim 9, wherein said rearranging for each set of destination
20 pixels is performed by assigning destination pixel values in accord with destination pixel priority values, each priority value determined by a distance relationship to a respective origin position.

25 11. A method for improving tone reproduction of a halftoning process, said method applied to an array of input pixels, said method comprising the steps of:

 a) for each said input pixel, producing an
30 average output tone comprised of one or more output sub-tones, said average output tone approximating a tone of said input pixel; and

b) with respect to said output tone, adjusting a pattern of tone distribution depending on a position of said input pixel so as to create an effect of a halftone pattern, wherein an individual cell of said
5 halftone pattern is created by halftoning a plurality of said input pixels.

12. The method as recited in claim 11, wherein said one or more output sub-tones are comprised of one
10 or more discrete output pixels.